4.8 FOUR MODEL ORDINANCES TO HELP CREATE PHYSICALLY ACTIVE COMMUNITIES

During the last decade of the twentieth century, a number of communities stepped up support for bicycling and walking as modes of transportation by planning for and providing the necessary infrastructure. Many are college towns (e.g., Madison, Wisconsin; Eugene, Oregon; Davis, California; and Boulder, Colorado). Since 1990, other newly developing and redeveloping cities and suburbs have also implemented plans that incorporate pedestrian, bicycle, and transit facilities. Some of the funding for such plans and projects has come from the federal Transportation Equity Act for the 21st Century (TEA-21), and its precedent law, the Intermodal Surface Transportation Efficiency Act of 1990 (ISTEA).

Both ISTEA and TEA-21 represented a departure in the traditional formula for federal and state transportation spending. Rather than devote resources almost exclusively to highway expansion and maintenance, the acts required states to set aside 10 percent of funding for projects that support nonautomobile modes of travel, including transit, bicycling, and walking. This shift occurred in large part in response to public and lawmakers' emerging awareness that the auto-only recipe for solving transportation problems (i.e., more, wider roads as the principal strategy) that had dominated transportation funding formulas since World War II was not fiscally or environmentally stable in the long term. Such concerns coincided with growing aversion for low-density urban sprawl and the resultant loss of open space, farmland, and diminished sense of place and community.

A key part of ISTEA and TEA-21 is the Transportation Enhancements Program, which provides states and local governments with monies for bike trails, sidewalks, public transportation, preservation and restoration of historic transportation facilities, and scores of other projects. Enhancements constitute about 2 percent of the overall funding of the federal-aid highway program. It has funded more than 15,000 projects nationwide, helping communities create bicycle and pedestrian paths, develop walkable downtowns, and protect scenic vistas and historical sites. To date, bicycle and pedestrian facilities, combined with rail-to-trails, comprise over one-half of all enhancement obligations.

A 2003 survey by the Surface Transportation Policy Project (STPP), a Washington, D.C.-based organization that monitors the implementation of federal transportation laws, demonstrated that the public has a desire to do more walking but that poorly designed communities and neighborhood streets often prevent them from doing so (STPP 2003). Design elements that survey respondents described as barriers to walking included inconvenient or nonexistent pedestrian routes from neighborhoods to transit stops and shopping streets, streets designed to encourage speeding, and dangerous intersections.

Much of what is implemented through the three model ordinances that follow (a pedestrian overlay district; an on-site access, parking, and circulation ordinance; and a shared parking ordinance) aims to meet the public's desire for walkable communities.

The standards that have arisen over time are in many cases direct responses to planning practices that run counter to the goal of creating active communities. Here is a sampling of those traditional practices, ranging from the very broad to the very specific:

- The perpetuation (through zoning and subdivision regulations) of low-density development, which is not conducive to walking or bicycling and thus is not conducive to incorporating activity into daily routines

- The regulatory challenge of implementing truly mixed-use developments and districts (coupled with the difficulties developers have securing financing for any project that departs from conventional subdivisions, strip shopping centers, or big box retail)

A preponderance of streets and street environments in American cities and towns that are unsafe and hostile toward anything except the automobile.

- A lack of street connectivity. Isolated, single-use subdivisions that have no direct connections to surrounding shopping areas, schools, or other destinations make it very difficult for people to choose to walk, even those that are motivated to do so.

- And finally, there are simple things, like allowing developers to either waive their sidewalk requirement in some cases or to not require sidewalks at all. Developers may argue that sidewalks add costs to development, and some neighbors may prefer the rural feel of a neighborhood without sidewalks, but neighborhoods send a direct message: No one walks here. The health consequences of what might seem like a fairly inconsequential requirement need to be recognized.

In the mid-1990s, the public health field began to focus its attention and support on bicycle and pedestrian planning and smart growth measures. That profession recognized that many of the community planning and design tools communities were using to implement smart growth objectives (e.g., mixing land uses, broadening transportation options, and encouraging compact form) could result in communities where people could be physically active on a regular basis and where air quality could be improved.

Attention by health professionals to the community design/physical activity relationship was sparked by soaring rates of obesity nationwide and recognition that longstanding models aimed at getting people to modify their exercise and eating habits to reduce their weight and improve their cardiovascular health were only modestly effective. Other factors recognized by health officials as being affected by land use and the built environment included the relationship of land-use decisions to air quality and respiratory health; the impact of urban design on the number of pedestrian injuries and deaths; the relationship between the built environment and transportation systems; the mobility and quality of life of the elderly; and the ways in which land-use decisions affect community water quality, sanitation, and outbreaks of disease (Frumkin 2002).

While the recent flurry of media and professional attention paid to the planning and public health connection may make it seem new, the two disciplines do have a long shared history. The first master plans and zoning ordinances enacted early in the twentieth century were aimed at preventing overcrowding and stemming the spread of contagious disease in urban areas, the result of the interaction of professional planners and public health officials and advocates. Early zoning laws required homes to be kept separate from noxious industry and nuisances, and mandated residential building designs that would provide tenement dwellers with adequate air and light.

As the century progressed, traditional town planning gave way to conventional urban sprawl, which was facilitated in part by zoning. In retrospect, the sharp separation of land uses, a

fundamental tenet of zoning, is now recognized as one of several hindrances to communities' efforts to create high-quality neighborhoods, to balance transportation, land use, jobs, and housing, and to protect the environment. Early zoning codes were regulatory tools used by governments to protect the public health and safety. The current concern is on how zoning and subdivision regulations and the plans that support them can be modified to help improve health. For example, conventional patterns of urban sprawl—(wherein housing, employment, schools, and shopping are at great distances from one another) have also all but precluded any mode of transportation other than driving for the vast majority of Americans. This pattern of development, combined with other lifestyle and dietary changes, has contributed to the growing epidemic of obesity and overweight among every age group in this country. These conditions are known causes of diabetes, cardiovascular disease, and early death. As we've learned more and more about the precise neighborhood and community characteristics that support active living and healthy people, planners and others have responded by crafting new planning and regulatory approaches that ultimately will result in healthier places. The three model ordinances set forth below represent three such tools that communities can use to meet health goals.

4.8.1 MODEL PEDESTRIAN OVERLAY DISTRICT (POD) ORDINANCE

The model Pedestrian Overlay District is to be superimposed on a zoning district map and incorporates additional requirements to those otherwise of the underlying zone. The ordinance addresses a specific mix of uses that generally work well in a pedestrian environment. In addition, it prohibits setbacks of principal buildings, contains standards for the inset of entrances in order to protect pedestrian movement, requires that ground floors of buildings are chiefly transparent and do not present blank walls, and mandates that the ground floors of parking garages contain commercial or service uses. The overlay includes standards for the installation of canopies over building entrances.

The overlay would be mapped on the local zoning map and may have different boundaries than the underlying zoning district. The standards contained in the overlay, however, would prevail when they conflict with provisions in the underlying zone. Where the overlay is silent, for example, on matters such as the location of accessory buildings and side yards, the underlying zoning district regulations would control.

This ordinance is intended to result in districts and areas in which people can walk to and from their destinations, and in which pedestrians are given preference over automobiles. Such an overlay district can be considered one of group of plan and ordinance types that seek to redirect land-use and transportation development and spending priorities toward a more balanced transportation network that accommodates all modes and all users. Such plans and ordinances also increasingly aim to promote and improve public health by creating environments where people have opportunities to incorporate physical activity into their daily routines.

One issue not addressed by this model is the matter of determining if and when to waive sidewalks. Sometimes local governments waive sidewalk requirements as part of the subdivision review process or fail to construct them when undertaking road construction, only to find that they are needed as an area develops. The only answer to this is to mandate

them everywhere and to use special assessment procedures, which vary according to state law. Such procedures require that either local property owners in developed areas install sidewalks at their own expense or the local government will install them and assess the property owners on a lineal front foot basis.

In some cases, such as in neighborhoods of predominately low- and moderate-income persons, federal Community Development Block Grants can cover sidewalk installation, eliminating the need to impose assessments. In other cases, the requirement of installation of sidewalks after an area is developed may be politically controversial, so the local government may decide to pay for their installation through its general fund, rather than assessments. Costs may also be reduced by installing asphalt pedestrian paths rather than concrete sidewalks, which must be poured in forms over an aggregate base and which are typically linked to the centerline elevation of the adjoining roadway. If a pedestrian orientation is what a community desires, however, some type of sidewalk is necessary, regardless of who pays. In general, sidewalks should be required, and waivers should be rare or nonexistent.

Primary Smart Growth Principle Addressed: Walkable neighborhoods
Secondary Smart Growth Principle Addressed: Mix land uses

101. Purpose

The purposes of the Pedestrian Overlay District (POD) are to:

(a) implement the [*applicable plan name*];

(b) create a healthful built environment in which individuals have opportunities to incorporate physical activity, such as walking, into their daily routine;

(c) create a safe, attractive pedestrian-friendly environment where the risk of pedestrian injuries or fatalities is minimized through the application of appropriate development standards; where residents have increased opportunities to interact with neighbors; where children can walk to and from school; and where the elderly have a safe convenient pedestrian routes;

(d) encourage active commercial and service uses on the ground floor of buildings; and

(e) prohibit development that discourages pedestrian activity.

102. Allowed Uses. Uses are allowed in a POD in accordance with the use table of this Section.

USE GROUP	Zoning District
Use Category	**POD**
Specific Use Type	
P= permitted by-right C = conditional use N = Not allowed	
RESIDENTIAL	
Household Living	
Artist Live/Work Space located above the ground floor	P
Artist Live/Work Space, ground floor	C
Dwelling Units located above the ground floor	P
Detached House	C
Multiunit (3+ units) Residential	C
Single-Room Occupancy	C
Townhouse	C
Two-Flat	C
Group Living	
Assisted Living	C
Group Home	P
Nursing Home	C
Temporary Overnight Shelter	C
Transitional Residences	C
Transitional Shelters	C
PUBLIC AND CIVIC	
Colleges and Universities	C
Cultural Exhibits and Libraries	C
Day Care	P
Hospital	C
Lodge or Private Club	C
Parks and Recreation	P
Postal Service	C
Public Safety Services	C
Religious Assembly	P
School, Public and Private	C
Utilities and Services, Minor	P
Utilities and Services, Major	C
COMMERCIAL	
Adult Use	N
Animal Services	
Shelter/Boarding Kennel	N
Sales and Grooming	P
Veterinary	P
Artist Work or Sales Space	P
Boat Sales, Repair, and Storage	N
Car Wash	N
Drive-Through Facility	N
Eating and Drinking Establishments	
Restaurant	P
Tavern	P

USE GROUP	Zoning District
Use Category Specific Use Type	**POD**
P= permitted by-right C = conditional use N = Not allowed	
Entertainment and Spectator Sports	
Small (1—149 seats)	P
Medium (150–999)	N
Large (1,000+)	N
Financial Services	P
Food and Beverage Retail Sales	P
Bicycle Sales and Service	P
Movie and Live Theatre	P
Gas Stations	N
Lodging	
Small (1–16 guest rooms)	P
Large (17+ guest rooms)	C
Medical Service	P
Vehicle Sales, Service and Repair	N
Office	P
Parking Lot	–
Parking Structure, Commercial (Non accessory; parking on second floor and levels above)	C
Personal Service, including health clubs and gyms	P
Repair Service, Consumer, including bicycles	P
Residential Storage Warehouse	N
Retail Sales, General	P
Vehicle Sales, Service, and Repair	N
INDUSTRIAL	
Manufacturing, Production and Industrial Services	
Artisan (hand-tools only; e.g., jewelry or ceramics)	P
Manufacturing	N
OTHER	
Wireless Communication Facilities	
Co-located	P
Freestanding (Towers)	C

Comment: *The model ordinance permits, by right, restaurants, retail food and beverage sales, and general retail uses. There are certain types of uses particularly appropriate in pedestrian districts that jurisdictions may want to encourage to locate in these districts. Coffee shops, bakeries, Internet cafes, bicycle shops, and bookstores are a few such uses. Uses that are institutional or governmental in nature are generally treated as conditional uses. A conditional use permit procedure for such uses (e.g., schools, colleges, and universities) is important to ensure that such uses have a pedestrian orientation incorporated in their building and site design.*

103. Setbacks

(1) All principal buildings shall be located on the front lot line.

(2) Any principal building located on a corner lot shall be located on the front lot line and on the side lot line abutting the street.

Comment: *Under this setback standard, sidewalk cafes and similar pedestrian-oriented uses would need to be located on public sidewalks. This is a common practice in large cities, where the municipal government establishes standards for the use of sidewalks and issues a permit that allows outdoor cafes.*

104. Building Entrances

(1) Building entrances facing a street shall be recessed into the face of the building to a depth that permits the entry door to open and close without projecting into the public right-of-way.

(2) A principal building located on a corner lot may provide a single primary entrance at the corner.

105. Transparency of Street-Level Floor Commercial and Public and Civic Buildings

(1) Blank street-level walls for commercial and public and civic buildings are not permitted on any street frontage in the Pedestrian Overlay District.

(2) At least [50] percent of the ground-level wall area of any new or reconstructed commercial or public and civic building facing a public street shall be devoted to interest-creating features, such as building entrances, murals, display windows, or windows affording views into retail, office, or lobby spaces. This requirement shall apply to both frontages of a building located on a corner lot.

(3) All parking structures located within the Pedestrian Overlay District as conditional uses shall have retail or service uses located the ground floor.

(4) Street-level openings on parking structures shall be limited to those necessary for retail store entrances, vehicle entrance and exit lanes, and pedestrian entrances to stairs and elevator lobbies.

106. Awnings and Canopies

(1) All commercial and public and civic buildings in a Pedestrian Overlay District shall have an awning or canopy over any building entrance that abuts the public right-of-way.

(2) Awnings or canopies shall:

(a) overhang the sidewalk on which the building fronts by a minimum of [five] feet; and

(b) if illuminated, be lit internally so that the lighting system is encased or otherwise screened from public view.

Comment: *An awning is a hood or cover made of fabric, metal, or glass that projects from the wall of a building, above ground-floor window, or over an entryway. In pedestrian-friendly areas, store signage is often printed on the awnings. Awnings emphasize a store's or restaurant's entrance, provides shade and weather protection for transit users, pedestrians, cafe patrons, and contributes to a high-quality streetscape. They add texture to the streetscape and interest and variety to the building facade, while protecting storefront displays from sun exposure. In rainy climates, a requirement that buildings install awnings on the first floor can create an environment where people can still walk and commute to work, shopping, or school without getting wet.*

A note about arcades: This model pedestrian overlay ordinance does not include provisions for arcades, nor does it recommend them. Arcades are recessed areas between the curb and the building wall that are open to the street. Most arcades are one or two stories in height. As an architectural feature arcades were very popular ground-floor feature of skyscrapers built in the 1960s and 1970s. They were widely used in zoning bonus programs as an amenity that the developer could provide in exchange for additional height and floor area above what the base zoning allowed. As their use grew, several design-related problems became clear. Most of the design problems stemmed from the fact that, beyond requiring that they be installed, many cities did not do any substantive urban design review of the arcades to determine if in fact it would be a pleasant, usable public space that connected with surrounding properties. For example, many arcades were dimly lit if lit at all, lacked sunlight, and were generally uninviting to and avoided by pedestrians. Many of them terminated at dead ends (e.g., the side of an adjacent building) and thus created a haphazard experience for pedestrians. From a retailing standpoint, the added distance created by an arcade between the building and the street, coupled with inadequate light, made the ground-floor retail spaces hard to see, meaning that shoppers couldn't find them and, consequently, building owners had a hard time keeping or recruiting retail tenants.

107. Through-Block Connections

Where necessary for public convenience or safety, a developer shall improve and dedicate to the public a [*10 to 30*]–foot-wide pedestrian and bicycle access way to connect to cul-de-sac streets, to pass through odd-shaped or oversized city blocks [600] feet or longer, to complete existing pedestrian and bicycle routes, and to provide for networks of public paths creating access to schools, parks, shipping centers, transit stops, or other destinations.

Comment: *Long blocks and cul-de-sacs often increase walking distances by prohibiting people on foot or bike to use the most direct route possible between their origin and destination. Through-block connections can shorten such walking trips and can thus decrease the tendency to drive between relatively close by destinations.*

108. Parking, including bicycles

(1) Pursuant to Section 102, surface parking lots are prohibited in the Pedestrian Overlay District.

(2) Parking Requirements.

[*Insert parking standards*]

Comment: *This model does not specify minimum or maximum parking standards for uses in the Pedestrian Overlay District. Cities that have enacted such districts (e.g., Portland, Oregon; Seattle, Washington; and Charlotte, North Carolina) have lessened the required amount of parking and in some cases do not require businesses to provide off-street parking at all. The rationale is that people will make more trips within the walkable district on foot, thus reducing demand for off-street parking. In Portland, a maximum parking standard is applied in the pedestrian district. Cities that have transit systems and transit-station area zones (with provisions similar to a pedestrian overlay district) often also reduce the amount of parking required for uses within a specific walking distance (e.g., one-quarter mile) of the transit station.*

(3) Minimum Required Bicycle Parking Spaces. The required minimum number of bicycle parking spaces is based on the principal uses on a site as shown in Table 1.

Comment: *Table 1 is adapted from the Portland, Oregon, Bicycle Parking Facilities Guidelines (2004). Standards are provided for various land-use categories and according to long-term and short-term needs. As used in this table, long-term spaces provide employees, students, residents, commuters, and others who generally stay at a site for several hours a secure and weather-protected place to park bicycles. The measure of security for long-term bicycle parking must be greater than that provided for short-term parking Short-term spaces provide shoppers, customers, messengers and other visitors who generally park for two hours or less a convenient and readily accessible place to park bicycles.*

Table 1
Minimum Required Bicycle Parking Spaces
in the Pedestrian Overlay District

Principal Use Categories	Specific Uses	Long-term Spaces	Short-term Spaces
Residential Categories			
• Household Living	Multidwelling	1 per 4 units	2, or 1 per 20 units
• Group Living		2, or 1 per 20 residents	None
	Dormitory	1 per 8 residents	None
Commercial Categories			
• Retail Sales And Service		2, or 1 per 12,000 SF of net building area	2, or 1 per 5,000 SF of net building area
	Temporary Lodging	2, or 1 per 20 rentable	2, or 1 per 20 rentable

		rooms	rooms
• Office		2, or 1 per 10,000 SF of net building area	2, or 1 per 40,000 SF of net building area
• Commercial Parking		10, or 1 per 20 auto spaces	None
• Commercial Outdoor Recreation		10, or 1 per 20 auto spaces	None
• Major Event Entertainment		10, or 1 per 40 seats or per CU* review	None
Industrial Categories			
• Manufacturing And Production		2, or 1 per 15,000 SF of net building area	None
• Warehouse And Freight Movement		2, or 1 per 40,000 SF of net building area	None
Institutional Categories			
• Basic Utilities		8	None
	Light-rail stations, transit centers,	10, or 5 per acre	None
• Community Service	Park and ride	2, or 1 per 10,000 SF of net building area	2, or 1 per 10,000 SF of net building area
• Parks And Open Areas		Per CU* review	Per CU* review
• Schools	Grades 2 through 5	2 per classroom, or per CU* review	None
	Grades 6 through 12	4 per classroom, or per CU* review	None
• Colleges	Excluding dormitories (see Group Living, above)	2, or 1 per 20,000 SF of net building area, or per CU* review	2, or 1 per 10,000 SF of net building area, or per CU* review
• Medical Centers		2, or 1 per 70,000 SF of net building area, or per CU* review	2, or 1 per 40,000 SF of net building area, or per CU* review
• Religious Institutions		2, or 1 per 4,000 SF of net building area	2, or 1 per 2,000 SF of net building area

• Daycare		2, or 1 per 10,000 SF of net building area	None
Other Categories			
• Aviation And Surface Passenger Terminals, Detention Facilities		Per CU* Review	Per CU* Review

* CU mean “conditional use.”

(6) Where the [local government] has established an on-street or off-street bikeway that adjoins or abuts the site, the internal on-site bicycle system for the use shall connect to it.

References

Charlotte, N.C., City of. Zoning Code, Part 9, Sections 9.901 et seq., Uptown Mixed-Use District, website [accessed December 15, 2004]: www.charmeck.org/Departments/Planning/Rezoning/City+Rezoning+Ordinance.htm

Clark County, Washington. Unified Development Code, 40.230.020 Mixed Use District [accessed December 15, 2004]: www.clark.wa.gov/commdev/documents/devservices/title40/40-230.pdf

Frumkin, Howard. 2002. “Urban Sprawl and Public Health.” *Public Health Report.* May-June; 117: 201-17.

Lee, Gary. 2003. Planner, City of Redmond, Wash. Department of Planning. Telephone conversation with Marya Morris. November 17.

Portland, Oregon, City of. *Bicycle Facility Parking Guideline*s [accessed December 17, 2004] www.trans.ci.portland.or.us/bicycles/parkguide.htm

Portland, Oregon, Metropolitan Regional Government. Metro Code, Urban Growth Management Functional Plan, Chapter 3.07, Title 6, Central City, Regional Centers, Town Centers, and State Community [accessed December 15, 2004]: www.metro-region.org/library_docs/about/chap307.pdf

Redmond, Washington, City of. Community Development Guide. Sec. 20C.40.105, City Center Pedestrian System. [accessed December 15, 2004]: http://www.codepublishing.com/WA/redmond.html

Seattle, Washington, City of. Municipal Code, Ch. 23.66, Subchapter III. International Special Review District [accessed December 15, 2004]: http://clerk.ci.seattle.wa.us/~public/code1.htm

Surface Transportation Policy Project. 2003. *Americans Attitudes Toward Walking and Creating Better Walking Environments.* Results of a telephone survey of 800 adults conducted for STPP by Belden, Russonello, and Stewart in October 2002. The report is available at: www.transact.org/report.asp?id=205

4.8.2. ON-SITE ACCESS, PARKING, AND CIRCULATION ORDINANCE

The model that follows establishes standards for on-site pedestrian access. It is intended to integrate with a local government's existing procedures for reviewing a variety of development types; consequently, it does not include new procedures in Section 102. It does emphasize the design of the site and the linkage of pedestrian and bicycle systems on the site to ensure that bicyclists and pedestrians are able to cross the site safely.

Primary Smart Growth Principle Addressed: Variety of transportation choices
Secondary Smart Growth Principle Addressed: Walkable neighborhoods

101. Purpose

(1) The purposes of this ordinance are to:

(a) implement the [*applicable plan name*];

(b) ensure that each development accommodates the safe and convenient movement of vehicles, bicycles, pedestrians, and transit throughout the proposed development and to and from surrounding areas; create a healthful built environment in which individuals have opportunities to incorporate physical activity, such as walking, into their daily routine;

(c) create a safe, attractive, pedestrian-friendly environment where the risk of pedestrian injuries or fatalities is minimized through the application of appropriate development standards; where residents have increased opportunities to interact with neighbors; and where the elderly have a safe convenient pedestrian routes;

(d) create a circulation system that contributes to the attractiveness of the development and the community as a whole; and

(e) establish standards for the review of development plans.

102. Definitions and Scope of Application

Comment: *This Section should define which developments are subject to review under the ordinance and how the standards are to be applied.*

103. Pedestrian Movement

(1) To the maximum extent feasible, site plans for proposed developments shall separate movement of pedestrians from movement of vehicles and bicycles, and protect bicyclists from conflicts with vehicles.

(2) Where complete separation of movement of pedestrians from movement of vehicles and bicycles is not possible, the site plan shall minimize potential hazards by using special paving, grade separations, pavement marking, signs, striping, bollards, median refuge areas, traffic calming features, landscaping, lighting, or other means to clearly delineate pedestrian areas for both day and night use.

(3) Where pedestrians and bicyclists share walkways, the pedestrian/bicycle system shall be designed to be wide enough to accommodate anticipated pedestrian and bicycle traffic volumes. A shared walkway shall have a minimum width of [eight] feet and shall comply with the American Association of State Highway and Transportation Officials (AASHTO) guidelines, as contained in AASHTO's *Guide for Development of Bicycle Facilities* (August 1999), which are adopted by reference and which shall be on permanent file in the [planning department].

(4) Curb cuts and ramps shall be located at convenient, safe locations for the physically disabled, bicyclists, and people pushing strollers or carts. The location and design of curb cuts and ramps shall meet the requirements of the [applicable building code] and the [local government] Americans With Disabilities Act ramp standards, and shall avoid crossing or directing traffic through loading areas, drive-in lanes, and solid waste storage and collection areas.

Comment: *For additional information on methods for separating pedestrians and bicycles from vehicles and on sidewalks or trails that are shared space, refer to* "Capacity Analysis of Pedestrian and Bicycle Facilities: Recommended Procedures" in the Pedestrians Chapter of the *Highway Capacity Manual. Available at* *www.walkinginfo.org/task_orders/to_8/to8/chap13/intro.htm*

104. Location of Bicycle Parking Facilities; Connection to Citywide System

(1) Bicycle parking facilities shall meet the following standards:

(a) A minimum number of bicycle parking spaces as set forth in [*cite to bicycle parking requirements section of the parking ordinance*] shall be provided on site. In making the determination, the [local government] shall consider when appropriate, the number of dwelling units or lodging rooms, the number of students, the number of

employees, and the number of auto parking spaces in accordance with the following guidelines.

(b) Bicycle parking facilities shall be located within [50] feet of building entrances and shall be visible from the uses they serve. They shall not be located so as to impede pedestrian or automobile traffic flow or to cause damage to plant material from bicycle traffic.

(c) Bicycle parking facilities shall be designed to allow the bicycle frame and both wheels to be securely locked to the parking structure. The structure shall be of permanent construction such as heavy gauge tubular steel with angle bars permanently attached to the pavement. Bicycle parking facilities shall be at least two feet in width and six feet in length, with additional back-out or maneuvering space of at least five feet.

[(d) Covered bicycle lockers. In areas with high demand for bicycle parking, the zoning administrator has the authority to require that a certain number of covered, lockable bicycle storage units are provided. Structures that require a user supplied locking device shall be designed to accommodate U shaped locking devices. All lockers and racks must be securely anchored to the ground or the building structure to prevent the racks and lockers from being removed from the location. The surfacing of such facilities shall be designed and maintained to be mud and dust free.]

(2) Where the [local government] has established an on-street or off-street bikeway that adjoins or abuts the site, the internal on-site bicycle system for the use shall connect to it.

105. Walkways and Pedestrian Access

(1) Walkways shall provide pedestrian access through parking lots from street sidewalks to building entries. Walkways shall be located and aligned to directly and continuously connect areas or points of pedestrian origin and destination, and shall not be

located and aligned solely based on the outline of a parking lot configuration unless such a configuration allows for direct pedestrian access.

(2) Such walkways shall have a paved surface not less than [five] feet in width and shall be grade separated from the parking lot or otherwise delineated with pavement markings, planters, or alternate paving material.

(3) Where the primary pedestrian access to the site crosses drive aisles or internal roadways, the pedestrian crossing shall emphasize and place priority on pedestrian access and safety. The material and layout shall be continuous as the pedestrian access crosses the driveway, with a break in continuity of the driveway paving and not in the pedestrian access way.

(4) The entirety of the on-site pedestrian walkway system shall be marked and defined using pavement treatments, signs, striping, lighting, median refuge areas, and landscaping, as appropriate.

REFERENCES

See References for 4.8.3, Model Shared Parking Ordinance

4.8.3. MODEL SHARED PARKING ORDINANCE

Communities have used several tools to minimize the overall amount of surface parking in neighborhoods, downtowns, and commercial areas. One tool has been to allow certain land uses to meet the minimum requirements for parking spaces by sharing spaces with other uses. Shared parking arrangements are applied when land uses are adjacent or in close proximity to one another, have different parking demand patterns, and are able to use the same parking spaces or lots throughout a day. Shared parking is also commonly used in mixed-use developments where commercial and office tenants have varying hours of operation. In general, shared parking is most effective when the land uses have significant different peak parking characteristics that vary by time of day, day of week and work for businesses, restaurants, churches, schools, and other uses.

Jurisdictions with shared parking standards tend to limit the types of land uses to which such provisions can be applied. For example, in Bastrop, Texas, shared parking may be allowed in the case of mixed uses (different buildings) for up to 50 percent of the parking spaces required for a theater or other place of evening entertainment (after 6:00 p.m.), or shared parking may be provided for a church when parking for banks, offices, and similar uses not normally open, used, or operated during the same hours as church events or services. Shared parking must be in the same parking lot (Bastrop 2003).

In Ft. Collins, Colorado, residential uses are prohibited from reducing the amount of parking required per unit by using shared parking. The rationale for this is that circumstances may arise where a resident is unable to access the shared lot and thus would have no parking available at all. Planners recognize that such a scenario would be very unpopular and could undermine the overall effort to promote shared parking (Barkeen 2003).

The commentary for Portland Metro's Model Shared Parking Ordinance notes that the closer shared spaces are to the land uses they serve, the more likely the arrangement will be a success. The model ordinance provides maximum distances between land uses and parking spaces that would make them eligible to be classified as shared parking spaces/areas (Portland Metro 1997).

Of the dozen or so ordinances that were reviewed for this model, Seattle offers the largest overall reductions in required parking in its shared parking provisions. For example, where an office use and a retail sales or service use share parking, the parking requirement for the retail sales and service use may be reduced by 20 percent, provided the reduction does not result in fewer spaces than the minimum required for the office use. For arrangements involving a residential and retail sales and service use, the residential use may reduce its parking by 30 percent, provided the reduction does not result in less than the minimum required for the retail and service use. Furthermore, no restaurant or entertainment uses may share parking with residential uses. And for residential and office use shared arrangements, the residential portion may be reduced by as much as 50 percent, provided there is still the minimum required amount for the office use. Jurisdictions using this model ordinance may consider applying no minimum number of required spaces for office uses if such an approach is appropriate and practical in the local districts.

The ordinance has additional provisions for shared parking arrangements between land uses that are either solely daytime uses or solely nighttime and Sunday uses. Daytime uses include administrative offices, retail sales and service (excluding restaurants), and wholesale storage. Nighttime and Sunday uses include restaurants and drinking establishments, religious uses, theaters, and school auditoriums. The planning director can authorize that up to 90 percent of the parking required for a daytime use may be supplied by the off-street parking provided by a nighttime or Sunday use and vice-versa, and up to 100 percent when the nighttime or Sunday use is a religious facility. Applicants must show there is no major conflict between the operating hours of the uses that share parking.

According to Mark Troxel, a land-use planning analyst with the city of Seattle, shared parking is applied primarily by single-owner, mixed-use buildings. This is the case for two primary reasons: Seattle's land-use code has many mixed-use zones, and the city strongly encourages mixed-use developments that incorporate residential and retail uses, residential and office uses, or a combinations thereof. Troxel says that because "parking is such a big cost driver" most developers are eager to use shared parking as a means of reducing the total number of spaces they must provide (Troxel 2004).

Less than 5 percent of the shared parking arrangements in Seattle are between adjacent properties with different owners. Troxel says this is largely because each property owner is required to sign a parking covenant, which essentially places an easement on the portion of the parking that one owner is providing to the other as part of the arrangement. In the past, landowners had signed covenants without a sunset date, essentially locking them in the arrangement indefinitely. Troxel says some of those arrangements became a problem for property owners who sell their property (when the new owners balk at the existing parking covenant) and for the other owner who still needed the parking but must deal with the new owner. Finally he says that in some cases property owners have granted rights to share parking for as many as six other properties for the exact same spaces. Such problems with the covenants and the oversharing of parking are difficult to enforce and are generally complaint driven.

The model shared parking ordinance here adapts Seattle's regulations. Under this model, applicants for zoning permits in certain areas within the community would either be required to evaluate the use of shared parking or may elect to do so. In case, the zoning administrator or other code enforcement official would promulgate guidelines for the preparation of shared parking feasibility studies, which applicants would use. Where the shared parking proposal entails two or more separately owned properties, the owners of those properties must enter into an agreement regarding access to, and maintenance and management of, the shared parking spaces. The zoning administrator may require applicants to submit a shared parking plan as part of the site plan requirements for a zoning permit.

Primary Smart Growth Principle Addressed: Variety of transportation choices
Secondary Smart Growth Principle Addressed: Compact building design

101. Purpose

(1) The purposes of the ordinance are to:

(a) allow a reduction in the total number of parking spaces required for certain properties in cases where a mix of adjacent land uses have varying peak periods of parking demand;

(b) reduce the overall amount of impervious surfaces, specifically the amount of land devoted to surface parking; and

(c) support [*insert applicable plan name*] policies that call for:

[*List relevant plan policies here such as: 1. Encouraging compact development and efficient use of land; 2. Promoting nonmotorized vehicle trips including walking and bicycling; and 3. Improving accessibility and mobility to common destinations for users of all transportation modes*.]

102. Applicability

(1) Applicants for a zoning permit for any change of use [shall *or* may] evaluate the feasibility of shared parking arrangements as part of their application where:

(a) The proposed use is in an area identified in [*applicable plan name*] as characterized by concentrated or mixed-use development, including land located in the following zoning districts:

[1. *Central business district*]

[2. *Town center district*]

[3. *Transit station or transit-oriented development district*]

[4. *Regional center district*]

[5. *Neighborhood commercial district*]

[6. *Main street district*]

Comment: *These are sample names for zoning districts. Users of this model can substitute their own districts.*

(b) The number of parking spaces proposed by the applicant is more than [10] percent of, or more than [10] spaces greater than, the minimum number of parking spaces required by the [parking standard ordinance], whichever is greater.

103. General Provisions

(1) Shared parking is allowed between two or more uses to satisfy all or a portion of the minimum off-street parking requirement.

(2) Shared parking is permitted between different categories of uses or uses with different hours of operation.

(3) A use for which an application is being made for shared parking shall be located within [800] feet of the parking facility.

(4) The reductions to parking permitted through shared use of parking shall be determined as a percentage of the minimum-parking requirement as modified by the reductions permitted in other sections of the parking ordinance.

Comment: *A jurisdiction may allow initial reductions in parking requirements for certain uses or in certain districts that would be calculated prior to the consideration of a shared parking arrangement. Seattle, for example, allows for reductions in parking standards for landmark buildings, for uses in areas where transit is available, and in pedestrian commercial zones.*

(5) An agreement providing for the shared use of parking, executed by the parties involved, shall be filed with [zoning administrator]. Shared parking privileges shall continue in effect only as long as the agreement, binding on all parties, remains in force. If the agreement is no longer in force, parking shall be provided as otherwise required by this chapter.

[*Section 104: Alternative 1*]

104. Calculation of Parking Requirements for Shared Parking; Shared Parking Feasibility Study

(1) Where shared parking arrangements are proposed, the [zoning administrator] shall determine the number of parking spaces that may be shared based on a shared parking feasibility study prepared by the applicant for a zoning permit. The[zoning administrator] shall promulgate written guidelines for the preparation of such studies by [date].

(2) A shared parking feasibility study shall:

(a) identify the properties and uses for the study (the study may include properties and uses not the subject of the zoning permit, provided that the applicant obtains a letter of authorization from the property owner or his or her agent);

(b) determine the number of parking spaces that would be required by applying the standard for the uses for all of the properties in subparagraph (2)(a) above;

(c) determine the peak parking demand for the combined demand of all of the uses for all of the properties in subparagraph (2)(a) above using standard parking generation rates in sources approved by the [zoning administrator]; and

(d) compare the results of (b) and (c) above.

If the [zoning administrator] finds that the shared parking feasibility study is consistent with guidelines promulgated pursuant to paragraph (1) above, the [zoning administrator] shall use the lesser of the two parking demands calculated in subparagraph (2)(d) above as the minimum number of parking spaces to be provided for all the properties and uses in the study;

(3) If standard parking generation rates for any of the uses in the study are not available, the applicant may collect data at similar sites to establish local parking demand rates. If the shared parking feasibility study assumes use of an existing parking facility, the applicant shall conduct field surveys to determine actual parking accumulation.

Comment: *The Urban Land Institute (2004) has developed procedures for conducting shared parking studies. For parking generation rates see, for example, APA PAS Report No. 510/511,* Parking Standards *(2001), which contains examples of parking standards from hundreds of ordinances around the U.S. In addition, see* Parking Generation, 3d edition *(2004) published by the Institute of Transportation* and Shared Parking Planning Guidelines *(ITE 1995), which contains guidelines for planning and regulating shared parking facilities.*

In The High Cost of Free Parking *author Donald Shoup assails planners' use of parking standards altogether. He argues that, because of numerous significant flaws in how jurisdictions calculate parking standards the amount of parking that gets built bears little or no relationship to what is actually needed. This has resulted in an oversupply of parking in many jurisdictions, which has had far reaching negative implications on everything from the natural environment to downtown revitalization efforts to making transit infeasible through low-density auto-dependent land use patterns. Readers of this report are strongly encouraged to read* The High Cost of Free Parking. *Although critical of the status quo in parking policy, it is sure to spark a lively debate in your community out of which some creative solutions to this problem could emerge (Shoup 2005).*

[*Section 104-Alternative 2*]

104. Calculation of Parking Requirements for Shared Parking Between Different Categories of Uses, Uses with Different Hours of Operation, and Uses of the Same Type

(1) Shared Parking for Different Categories of Uses. Business establishments constituting different categories of use may share parking as follows:

(a) If an office use and a retail sales and service use share parking, the parking requirement for the retail sales and service use may be reduced by 20 percent, provided that the reduction shall not exceed the minimum parking requirement for the office use.

(b) If a residential use shares parking with a retail sales and service use other than lodging uses, eating and drinking establishments or entertainment uses, the parking requirement for the residential use may be reduced by 30 percent, provided that the reduction does not exceed the minimum parking requirement for the retail sales and service use.

(c) If an office and a residential use share off-street parking, the parking requirement for the residential use may be reduced by 50 percent, provided that the reduction shall not exceed the minimum parking requirement for the office use.

(2) Shared Parking for Uses With Different Hours of Operation.

(a) For the purposes of this Section, the following uses shall be considered daytime uses, operating anytime between the hours 8:01 a.m. and 5:59 p.m. [Monday through Friday only]:

1. Customer service and administrative offices

2. Retail sales and services, except [eating and drinking establishments and] entertainment uses

3. Wholesale, storage and distribution uses

4. Manufacturing uses

5. Other similar primarily daytime uses, as determined by the [zoning administrator].

(b) For the purposes of this section, the following uses shall be considered nighttime uses, operating anytime between the hours of 6:00 p.m. and 8:00 a.m., or [Saturday and] Sunday uses:

1. Auditoriums accessory to public or private schools

2. Religious facilities

3. Entertainment uses, such as theaters, bowling alleys, and dance halls

[4. Eating and drinking establishments]

5. Other similar primarily nighttime or Sunday uses, as determined by the [zoning administrator]

Comment: *A good deal of judgment must be applied to determine which uses are "daytime" and which are "nighttime" activities because these are not cut-and-dried*

determinations. Of these, eating and drinking establishments may be the most problematic. A restaurant that is a "supper club" would be a "nighttime" use, but one that serves breakfast and lunch would not. For that reason, they have been placed in brackets.

(c) The [zoning administrator] may authorize upon application the use of up to 90percent of the required off-street parking for a daytime use to serve as the required off-street parking provided for a nighttime or Sunday use and vice-versa, except that this may be increased to 100 percent when the nighttime or Sunday use is a religious facility. The applicant shall demonstrate that there is no substantial conflict in the principal operating hours of the uses for which the sharing of parking is proposed.

(3) Shared Parking for the Uses of the Same Type

(a) The [zoning administrator] may authorize in writing shared parking arrangements between two or more commercial uses having the same or overlapping operating hours, allowing reductions in the total minimum number of required parking spaces as follows:

1. Up to a 20 percent reduction in the total minimum number of required parking spaces for four or more separate establishments;

2. A 15 percent reduction in the total minimum number of required spaces for three establishments; and

3. A 10 percent reduction in the total minimum number of required spaces for two establishments

(b) No reductions to the parking requirement shall be made if the proposed business establishments have previously received a reduction through the provisions for shared parking under paragraphs (1) or (2) above.

(c) The establishments for which the application is being made for shared parking shall be located within 800 feet of the parking facility. The parking facility shall be located in a commercial or residential-commercial zone.

(d) The reductions to parking quantities allowed through shared parking shall be determined as a percentage of the minimum parking requirement as stated in Section [cite to Section establishing minimum parking requirements by use].

(e) New business establishments seeking to meet parking requirements by becoming part of an existing shared parking arrangement shall provide the [zoning administrator] with an amendment to the agreement stating their inclusion in the shared parking facility or area.

105. Written Agreement between Property Owners to Share Parking

(1) Where an application for a zoning permit for which shared parking is proposed includes two or more separately owned properties and the [zoning administrator] has made a determination of the minimum number of required parking spaces for the each of the applicable properties and uses, the [zoning administrator] shall require that the owners of the properties enter into a legal agreement guaranteeing access to, use of, and management of designated shared parking spaces. The agreement shall be in a form approved by the [local government law director], included as a condition of the zoning permit, and enforceable by the [local government].

(2) Where an application for a zoning permit for which shared parking is proposed includes two or more properties owned by the same property owner and the [zoning administrator] has made a determination of the minimum number of required parking spaces for the applicable properties and uses, the [zoning administrator] shall require that the owner of the properties shall enter into a legal agreement with the [local government] guaranteeing access to, use of, and management of designated shared parking spaces. The agreement shall be in a form approved by the [local government law director], included as a condition of the zoning permit, and enforceable by the [*local government*].

106. Shared Parking Plan

(1) The [zoning administrator] may require an applicant for a zoning permit that incorporates shared parking to submit a shared parking plan. Such a plan shall be included as an addendum to a site plan and shall be drawn to the same scale. A shared parking plan includes one or more of the following:

(a) A site plan showing parking spaces intended for shared parking and their proximity to the uses they will serve.

(b) A signage plan that directs drivers to the most convenient parking areas for each particular use or group of uses, if such distinctions can be made.

(c) A pedestrian circulation plan that shows connections and walkways between parking areas and land uses.

(2) The shared parking plan shall satisfy the following standards, as applicable:

(a) Shared spaces for residential units must be located within [300] feet of dwelling unit entrances they serve.

(b) Shared spaces at nonresidential uses must be located within [500] feet of the principal building entrances of all sharing uses. However, up to [20] percent of the spaces may be located greater than [500] feet but less than [1,000] feet from the principal entrances.

(c) Clearly delineated and direct pedestrian connections must be provided from the shared parking area(s) to the building entrances.

(d) Pedestrians shall not be required to cross an arterial street to access shared parking facilities except at a signalized intersection along a clearly delineated pedestrian pathway.

REFERENCES

Barkeen, Bob. 2003. Current Planner, City of Ft. Collins, Colorado, Department of Planning. Telephone conversation with Marya Morris. November 18.

Bastrop. Texas, City of. Municipal Ordinance 2003-14, pertaining to rules for computing the number of parking spaces [accessed December 16, 2004]: www.cityofbastrop.org/ordinances/ord03-14.htm

"Capacity Analysis of Pedestrian and Bicycle Facilities: Recommended Procedures for the '*Pedestrian*" Chapter of the *Highway Capacity Manual." Available at www.walkinginfo.org/task_orders/to_8/to8/chap13/intro.htm*

Davidson, Michael, and Fay Dolnick. 2001. *Parking Standards.* Planning Advisory Service Report No. 510/511. Chicago: American Planning Association.

Fort Collins, Colorado, City of. Land Use Code, Sec. 3.2.2. Access, Circulation, and Parking [accessed December 17, 2004]: www.colocode.com/ftcollins/landuse/article3.htm - div3d2

Institute of Transportation Engineers (ITE). 2004. *Parking Generation.* Washington, D.C.: ITE

Portland Metro. 1997. *Shared Parking in the Portland Metro Area*, Appendix A. Model Shared Parking Ordinance Provisions; Appendix B. Model Shared Parking Agreement. January 1. website [accessed December 16, 2004]:

www.metro-region.org/library_docs/land_use/sharedpark.pdf

Portland, Oregon, City of. Zoning Ordinance, Chapter 33.26, Parking and Loading, and Section 33.266.115 Maximum Allowed Parking Spaces [accessed December 17, 2004]: www.portlandonline.com/shared/cfm/image.cfm?id=53320

Redmond, Washington, City of. *Community Development Guide* [Development Regulations], Section 20D.130.10-020 Required Off-Street Parking (including maximum parking standards) and Section 20D.130.10-030 Design Requirements for Parking Facilities [accessed December 17, 2004]: http://www.codepublishing.com/WA/redmond.html

Seattle, Washington, City of. Municipal Code. Ch. 23.54 Quantity and Design Standards for Off-Street Parking and Access, Section 23.54.020 Parking quantity exceptions [accessed December 16, 2004]: http://clerk.ci.seattle.wa.us/~public/code1.htm

Troxel, Mark. 2004. Senior Planner. City of Seattle Department of Planning and Development. Telephone conversation with Marya Morris. January 7.

The Urban Land Institute. 1983. *Shared Parking.* Washington D.C.: ULI.

An Example of a Shared Parking Calculation

Calculate the shared parking required for a mixed-use development with a 40,000-gross-square-foot (GSF) office building and a 5,000 GSF Restaurant.

Step 1. Determine the base parking required (as per the local parking ordinance) for each land use.

Assume the parking standards ordinance requires, at a minimum, 2.7 spaces per 1,000 GSF for office uses and 15.3 spaces per 1,000 GSF for restaurants.

Parking for offices = 2.7 x 40,000/1,000 = 108 spaces
Parking for restaurant = 15.3 x 5,000/1,000 = 77 spaces

Combined base requirement: 108 + 77 = 185 spaces

Step 2. Based on the hourly variation in parking demand, determine the peak parking demand for the combined demand of all the uses in the development.

Standardized data (e.g., those contained in the Urban Land Institute report, *Shared Parking)* or other studies should be used to estimate hourly variations. Field studies can also be performed on similar land uses within the jurisdiction to establish the hourly variation patterns. This analysis may be needed for both weekdays and weekends, depending on the type of uses involved, and may need to consider seasonal peak periods.

Table 1: Weekday Hourly Parking Demand Ratios for Office Buildings And Restaurants (Source: ULI, *Shared Parking* , 1983)

Hour of Day	Office Parking Demand per 1,000 GSF	*40,000 GSF Office*	Restaurant Parking Demand per 1,000 GSF	*5,000 GSF Restaurant*	*Total Spaces Needed to Meet Combined Demand*
(1)	(2)	(3)	(4)	(5)	(6)
10 AM	3.0	120	4.0	20	140
11AM	*3.0*	*120*	6.0	*30*	*150*
12 noon	2.7	108	10.0	50	158
1 PM	***2.7***	***108***	***14.0***	***70***	***178***
2 PM	2.9	116	12.0	60	176
3 PM	2.3	92	12.0	60	152
4 PM	2.3	92	10.0	50	142
5 PM	1.4	56	14.0	70	126
6 PM	0.7	28	18.0	90	118
7 PM	*0.2*	*8*	*20.0*	*100*	*108*
8 PM	*0.2*	*8*	*20.0*	100	108

Example: Table 1 shows the various hourly parking demand rates for offices and restaurants (columns 2 and 4) from ULI data. These rates were multiplied by the GSF of each development to determine the number of parking spaces needed each hour during a typical

weekday. The hourly parking demands for this example are shown in Figure 1. Below is the combined peak parking demands for several critical hours during the day

Combined Demand for Office peak hour at 11 a.m.:

Office = 3.0 spaces/1,000 GSF; Restaurant = 6.0/1,000 GSF

Combined Demand = (3.0 x 40) + (6.0 x 5) = 120 + 30 = 150 spaces

Combined Demand for Restaurant peak hour at 7 p.m.:

Office = 0.2 spaces/1,000 GSF, Restaurant = 20.0/1,000 GSF
Combined Demand = (0.2 x 40) + (20.0 x 5) = 8+100 = **108 spaces**

Peak Demand for Combined Uses at 1 p.m.:

Office = 2.7 spaces/1,000 GSF, Restaurant =14.0/1,000 GSF
Combined Demand = (2.7 x 40) + (14.0 x 5) = 108 + 70 = **178 spaces**

Peak-Hour Parking Demand for Combination of Uses = 178 spaces

Step 3. Compare the calculations of the two steps above, and the lesser of the two parking demands shall be used as the minimum number of parking spaces required.

Example:

Minimum parking required for both uses according to local parking standards = 185 spaces

Peak-hour parking needs with shared parking = 178 spaces

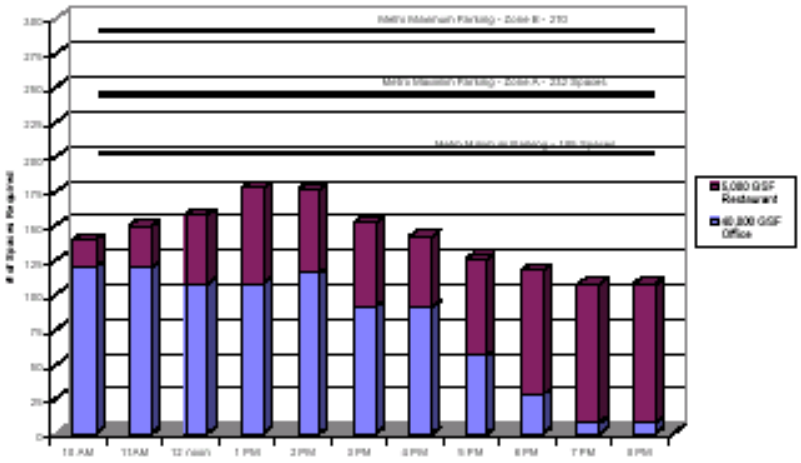
185 – 178 = Net savings of 7 spaces

Table 2 – Combined Parking Requirements from Metro, *Urban Growth Management Functional Plan* (11/96)

Metro Codes	Office Code Req.	40,000 GSF Office	Restaurant Code Req.	5,000 GSF Restaurant	Total Required	Total Demand	Net Savings
Minimum	2.7	108	15.3	77	185	178	7
Maximum - Zone A	3.4	136	19.1	96	232	178	54
Maximum - Zone B	4.1	164	23	115	279	178	101

Table 2 shows the potential savings in the construction of parking spaces based on the calculations in the example. Using the maximum parking ratio requirements from the Portland, Oregon, Metro Functional Plan for its Zones A and B, a shared parking arrangement could save as many as 101 parking spaces. The effect of shared parking for this example is also shown in Figure 1.

Figure 1 - Parking Comparison – Shared Parking Demand versus Code Requirements



4.8.4. MODEL STREET CONNECTIVITY STANDARDS ORDINANCE

Street connectivity ordinances are designed to increase the number of street connections in a neighborhood and to improve the directness of routes (Handy 2003, 68). The purpose is to achieve an open street network that provides multiple routes to and from destinations. Such a network is key to supporting walking and bicycling as a convenient, safe, and healthy form of transportation. It also discourages the proliferation of limited access street designs where residential subdivisions have but one or two points of entry and exit, and where commercial developments have access only onto arterial streets with no connections to adjacent properties.

The growing trend in cities enacting connectivity requirements is reflective of several larger trends and forces shaping planning and land development. These trends include the following:

- Acknowledgment that bicycling and walking need to be routinely accommodated as transportation modes in regional and local transportation plans, models, and funding formulas

- Recognition that the traditional street hierarchy of arterial, collector, and local streets has reinforced the problems caused by conventional single-use zoning, including neighborhood isolation and inaccessibility (by all modes, but in particular walking) between origins and destinations.

- Inclusion of traditional town planning principles (i.e., New Urbanism) in the mainstream of community planning and design whether on a communitywide or project-level scale.

- Growing recognition of the relationship between neighborhood design and residents' level of physical activity and rates of overweight and obesity (Dannenberg, Jackson, et al. 2003; Frank, Andresen, & Schmid 2004; Frank, Engleke, and Schmid 2003).

- The desire of residents, local officials, and others to tame the effects of the automobile on communities and to provide alternative transportation modes at the neighborhood, city, and regional levels.

In general, connectivity requirements have the purposes of creating multiple, alternate routes for automobiles and creating more route options for people on foot and on bicycles. Additional requirements can be added to the ordinances to establish pedestrian routes and passageways between land uses that can link isolated subdivisions to each other and create the shortest, safest routes possible between origins and destinations. Almost all communities that have pursued street connectivity also prohibit or greatly limit gated streets or gated communities.

Handy (2003) describes what supporters of connectivity point to as its potential benefits and what those who oppose it see as its potential detriments.

- Perceived benefits:

- Decreased traffic on arterial streets
- Continuous and more direct routes for travel by walking and biking
- Greater emergency vehicle access
- Improved utility connections, easier maintenance, and more efficient trash and recycling pick up

- Perceived detriments:
  - Increased traffic on residential streets
  - Increased infrastructure costs and impervious cover
  - The need for more land for development, thus increasing housing costs and threatening the profitability of housing development

Handy says these potential outcomes have not been adequately studied to fully determine which assertions are most supportable. Furthermore, what research there is on connectivity has generally compared the extremes—the traditional grid with a conventional suburban curvilinear pattern—ignoring the fact that many communities have a hybrid of the two systems. She concludes that connectivity requirements should be aimed at increasing connections without significantly increasing through-traffic in residential areas. This can be done by avoiding long, straight streets that may encourage speeding, using curves to slow traffic, and allowing cul-de-sacs as well as bicycle cut-throughs where natural or built features prevent connectivity.

Connectivity ordinances generally use one of two methods to evaluating proposed developments. The first and most common method is to establish a maximum block length. In Portland, Oregon, the maximum block length is 530 feet; in Austin, Texas, 600 feet; and in Ft. Collins, Colorado, 660 feet. The appropriate block length for any community can be determined by examining and measuring the dimensions of blocks in residential areas of the city that reflect the desired scale, character, and connectivity the municipality is hoping to achieve within new developments. For example, consider the specific block lengths of identifiable areas of these cities: the mean block length in San Francisco's city center is 353 feet; in Lower Manhattan, 274 feet; and in areas of Boston built as of 1895, 190 feet (Jacobs 1993).

The second measurement method is a connectivity index. Such indices are calculated by dividing the number of streets links (i.e., street sections between intersections, including cul-de-sacs) by the number of street nodes (i.e., intersections and cul-de-sacs). The city of Cary, North Carolina, for example, requires a street connectivity index of 1.2 or higher. That means a neighborhood with 50 street links would need to have approximately 41 street nodes to meet the standard.

The model ordinance below uses the more common block-length approach rather than the index approach. The model is sufficiently flexible for a jurisdiction to apply the index measurement if it so desires.

(A note regarding one-way streets: *Although not addressed in the ordinances reviewed for this model, the use of one-way streets can affect street connectivity and more importantly pedestrian, bicyclist, and motorist safety. On the one hand, one-way streets can simplify crossings for pedestrians, who must look for traffic in only one direction; however, studies have shown that conversion of two-way streets to one-way generally reduces pedestrian*

crashes, but one-way streets tend to result in higher auto speeds, which creates other safety problems.)

As a system, one-way streets can also increase travel distances for motorists and bicyclists, and can create confusion, especially for nonlocal residents. For pedestrians, provided they are on a grid or modified grid pattern, one-way streets should not increase the length of a route. One common factor that can make a one-way street system confusing to pedestrians is signage identifying street names. Often cities will install street signs that face only in the direction of oncoming traffic.

According to the Pedestrian and Bicycle Information Center, one-way streets operate best in pairs, separated by no more than 0.4 km (0.25 mi) (www.pedbikeinfo.org, 2004/). If one-way streets are being present in the area in which street connectivity requirements are being applied, this standard should be considered.

Primary Smart Growth Principle Addressed: Walkable neighborhoods
Secondary Smart Growth Principle Addressed: Variety of transportation choices

101. Purpose

(1) The purpose of this ordinance is to support the creation of a highly connected transportation system within the [municipality name] to:

(a) provide choices for drivers, bicyclists, and pedestrians;

(b) promote walking and bicycling;

(c) connect neighborhoods to each other and to destinations, such as schools, parks, shopping, libraries, and post offices, among others;

(d) provide opportunities for residents to increase their level of physical activity each day by creating walkable neighborhoods with adequate connections to destinations;

(e) reduce vehicle miles traveled and travel time to improve air quality and mitigate the effects of auto emissions on the health of residents;

(f) reduce emergency response times;

(g) increase effectiveness of municipal service delivery; and

(h) restore arterial street capacity to better service regional long-distance travel needs.

102. Definitions

As used in this ordinance, the following words and terms shall have the meanings specified herein:

"Arterial street" means a street that primarily accommodates through-traffic movement between areas and across the local government, and that secondarily provides direct access to abutting property.

"Connectivity" means a system of streets with multiple routes and connections serving the same origins and destinations.

"Development" means a subdivision, resubdivision, planned unit development, [insert name of any other type of development], or any other type of land-use change that results in the creation of public or private streets.

"Local Street System" means the interconnected system of collector and local streets providing access to a development from an arterial street.

"Resubdivision" means [cite to definition of resubdivision in local subdivision regulations].

"**Subdivision"** means [cite to definition of "subdivision" in subdivision regulations].

103. Relationship to other Adopted Plans and Ordinances

The design and evaluation of vehicular, bicycle, and pedestrian circulation systems built in conjunction with new residential and nonresidential development and the application of the street connectivity requirements to those developments shall conform to [list all applicable ordinances and plans].

104. General Standards

(1) A proposed development shall provide multiple direct connections in its local street system to and between local destinations, such as parks, schools, and shopping, without requiring the use of arterial streets. Each development shall incorporate and continue all collector or local streets stubbed to the boundary of the development plan by previously approved but unbuilt development or existing development.

(2) To ensure future street connections to adjacent developable parcels, a proposed development shall provide a local street connection spaced at intervals not to exceed [660] feet along each boundary that abuts potentially developable or redevelopable land.

(3) A proposed development shall provide a potentially signalized, full-movement intersection of a collector or a local street with arterial street at an interval of at least every 1,320 feet or one-quarter mile along arterial streets. A proposed development shall provide an additional nonsignalized, potentially limited movement, intersection of a collector or local

street with an arterial street at an interval not to exceed 660 feet between the full movement collector and the local street intersection.

(4) The [local government] engineer may require any limited movement collector or local street intersections to include an access control median or other acceptable access control device.

(5) The requirements of paragraphs (1), (2), and (3) above may be waived if, in the written opinion of the [local government] engineer, they are infeasible due to unusual topographic features, existing development, or a natural area or feature.

(6) Gated street entryways into residential developments are prohibited.

References

Beaverton, Oregon, City of. n.d. *Development Code*, Chapter 60 Special Requirements, 60.55 Transportation Facilities [accessed December 16, 2004]: www.ci.beaverton.or.us/departments/CDD/docs/development/chapter60/60_55.pdf

Cary, North Carolina, Town of. n.d. *Land Development Ordinance*. Sec. 7.10 Connectivity [accessed December 16, 2004]: www.townofcary.org/depts/dsdept/P&Z/ldo/chapter7.pdf.

Cornelius, North Carolina, Town of. n.d. *Land Development Code*, Section 7.1 General Street Design Principles : [accessed December 16, 2004]: http://other.cornelius.org/planning/LDC Chapters/Chapter 7 Streets, Parking & Lighting.PDF

Dannenberg, A.L., R.J. Jackson, et al. 2003. "The Impacts of Community Design and Land Use Choices on Public Health: A Scientific Research Agenda." *American Journal of Public Health.* 3, 9: 1500-1508.

Frank, L. D., J. F. Sallis, et al. 2006. "Many Pathways from Land Use to Health." *Journal of the American Planning Association.* 72, 1: 75-87.

Frank, L.D., M. Andresen, and T. Schmid. 2004. "Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars." *American Journal of Preventive Medicine*. 27, 2: 87-96.

Frank L.D., P.O. Engelke, & T. L. Schmid. *Health and Community Deign: The Impact of the Built Environment on Physical Activity.* Washington, D.C.: Island Press.

Frumkin, H. 2002. "Urban Planning and Public Health." *Public Health Reports.* May/June.

Ft. Collins, Colorado, City of. n.d. *Land Use Code*, Sec. 3.6.3 Street Pattern and Connectivity Standards [accessed December 16, 2004]: www.colocode.com/ftcollins/landuse/article3.htm - div3d6.

Handy, S. 2003. *Planning for Street Connectivity: Getting from Here to There*, Planning Advisory Service Report No. 515. Chicago: American Planning Association, May.

Jacobs, Alan. 1993. *Great Streets.* Cambridge: MIT Press.

Orlando, Florida, City of. n.d. *Southeast Orlando Sector Plan Development Guidelines and Standards*, Connectivity Index, website [accessed December 16, 2004]: www.cityoforlando.net/planning/pdf/seplan5.pdf

Plaster, S.C., S.L. Carter, and A. Dannenberg, "Zoning Out Crime and Improving Community Health in Sarasota, Florida 'Crime Prevention Through Environmental Design.'" *American Journal of Public Health.* 94 (September 2003): 1442-1445.

Portland, Oregon, City of. n.d.., Metropolitan Regional Government, *Metro Code*, Urban Growth Management Functional Plan, Chapter 3.07, Title 6, Central City, Regional Centers, Town Centers, and State Community [accessed December 15, 2004]: www.metro-region.org/library_docs/about/chap307.pdf

Portland, Oregon, City of. n.d. *Municipal Code*, Title 33 Planning and Zoning, Chapter 33.654, Rights of way, Section 33.654.122, Connectivity and Rights of Way [accessed December 16, 2004]: www.portlandonline.com/shared/cfm/image.cfm?id=53453

Raleigh, North Carolina, City of. 2002. *Comprehensive Plan*, "Urban Design Guidelines, General Street Design Principles" [accessed December 16, 2004]: www.raleighnc.gov/portal/server.pt/gateway/PTARGS_0_2_4748_0_0_18/CP-Urban_Design_Guidelines-Text.pdf.